

Claims

5 1. A pressure sensitive adhesive comprising (a) a major amount of at least one acrylate or methacrylate ester, (b) from about 8% to about 30% by weight of at least one nitrogen containing monomer, (c) from about 0.5% to about 15% by weight of at least one unsaturated carboxylic acid, and (d) at least one cross linkable monomer.

10 2. The adhesive of claim 1 wherein the adhesive has a glass transition temperature of less than about 10 degrees C.

15 3. The adhesive of claim 1 wherein (a) is present in an amount from about 55% to about 90% by weight.

20 4. The adhesive of claim 1 wherein (a) is an acrylate or methacrylate ester containing from about one to about 24 carbon atoms in the alkyl group.

25 5. The adhesive of claim 1 wherein (a) is selected from 2-ethylhexyl acrylate, isooctyl acrylate, butyl acrylate, sec-butyl acrylate, methyl butyl acrylate, 4-methyl-2-pentyl acrylate, isodecyl methacrylate, their hydroxy substituted analogs, and mixtures thereof.

6. The adhesive of claim 1 wherein (b) is selected from N-vinyl pyrrolidone, N-vinyl caprolactam, 1-vinyl-2-piperidone, 1-vinyl-5-methyl-2-pyrrolidone, and mixtures thereof.

7. The adhesive of claim 1 wherein (b) is N-vinyl pyrrolidone.

8. The adhesive of claim 1 wherein (c) comprises acrylic acid, methacrylic acid, fumaric acid, maleic acid or anhydride, allyl acid, and of two or more thereof.

9. The adhesive of claim 1 wherein (c) is present in an amount from about 0.5% to about 15%.

25 10. The adhesive of claim 1 wherein (d) is a glycidyl monomer.

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11. The adhesive of claim 10 wherein (d) comprises epoxy acrylate or methacrylate esters, and glycidyl allyl esters.

12. The adhesive of claim 10 wherein (d) is present in an amount from about 0.05% to about 2%.

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13. The adhesive of claim 1 further comprising (e) at least one alkyl acrylate and methacrylate ester containing less than 4 carbon atoms in the alkyl group.

14. The adhesive of claim 13 wherein (e) comprises methyl acrylate, ethyl acrylate, methyl methacrylate, ethyl methacrylate, and mixtures of two or more thereof.

10 15. The adhesive of claim 1 further comprising (f) at least one co-polymerizable monomer.

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16. The adhesive of claim 15 wherein (f) comprises polystyryl ethyl methacrylate, acetoacetoxy ethyl methacrylate, alpha olefin, and vinyl esters of alkanoic acids containing more than three carbon atoms.

15 17. The adhesive of claim 1 further comprising at least one plasticizer.

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18. The adhesive of claim 17 wherein the plasticizer is selected from an adipate, a phosphate, a benzoate, a phthalate esters, a polyalkylene oxide, a sulfonamide, and mixtures of two or more thereof.

19. The adhesive of claim 1 further comprising a tackifier.

20 20. The adhesive of claim 1 further comprising at least one cross linking agent.

21. The adhesive of claim 20 wherein the crosslinking agent is aluminum acetylacetone or a polyamine.

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22. A pressure sensitive adhesive comprising a blend of (1) the pressure sensitive adhesive of claim 1 and (2) a second pressure sensitive adhesive comprising (a) a major amount of at least one acrylate or methacrylate ester,

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(b) from about 0.5% to about 10% by weight of at least one nitrogen containing monomer, (c) from about 0.5% to about 15% by weight of an unsaturated carboxylic acid, and (d) at least one cross linkable monomer.

23. The adhesive of claim 22 further comprising a cross linking agent.

5 24. The adhesive of claim 23 wherein the crosslinking agent is aluminum acetylacetone or a polyamine.

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25. A pressure sensitive adhesive comprising a blend of (1) a pressure sensitive adhesive comprising (a) a major amount of at least one acrylate or methacrylate ester, (b) from about 8% to about 30% by weight of at least one nitrogen containing monomer and (c) at least one unsaturated carboxylic acid, and (2) a second pressure sensitive adhesive comprising (a) a major amount of at least one acrylate or methacrylate ester, (b) from about 0.5% to about 10% by weight of at least one nitrogen containing monomer, (c) at least one unsaturated carboxylic acid and (d) at least one crosslinkable monomer.

15 26. The adhesive of claim 25 wherein (a) of (1) and (2) is independently an acrylate or methacrylate ester containing from about one to about 24 carbon atoms in the alkyl group.

27. The adhesive of claim 25 wherein (a) of (1) and (2) is independently selected from 2-ethyl hexyl acrylate, isooctyl acrylate, butyl acrylate, sec-butyl acrylate, 20 methyl butyl acrylate, 4-methyl-2-pentyl acrylate, isodecyl methacrylate, their hydroxy substituted analogs, and mixtures thereof.

28. The adhesive of claim 25 wherein (b) of (1) and (2) is independently selected from N-vinyl pyrrolidone, N-vinyl caprolactam, 1-vinyl-2-piperidone, 1-vinyl-5-methyl-2-pyrrolidone, and mixtures thereof.

25 29. The adhesive of claim 25 wherein (b) of (1) and (2) is independently N-vinyl pyrrolidone.

SAC 30. The adhesive of claim 25 wherein (c) of (1) and (2) independently comprises acrylic acid, methacrylic acid, fumaric acid, maleic acid or anhydride, allyl acid, or mixtures of two or more thereof.

5 31. The adhesive of claim 25 wherein (c) of (1) and (2) independently is present in an amount from about 0.5% to about 15%.

32. The adhesive of claim 25 wherein (1) further comprises (d) at least one cross linkable monomer, or mixtures of two or more thereof.

SAC 33. The adhesion of claim 32 wherein (d) is at least one glycidyl monomer.

10 34. The adhesive of claim 32 wherein (d) comprises epoxy acrylate or methacrylate esters or glycidyl allyl esters.

35. The adhesive of claim 32 wherein (d) is present in an amount from about 0.05% to 2%.

36. The adhesive of claim 25 wherein (2) further comprises (d) at least one cross linkable monomer.

SAC 15 37. The adhesion of claim 36 wherein (d) is at least one glycidyl monomer.

38. The adhesive of claim 36 wherein (d) comprises epoxy acrylate or methacrylate esters or glycidyl allyl esters.

39. The adhesive of claim 36 wherein (d) is present in an amount from about 0.05% to 2%.

20 40. The adhesive of claim 25 wherein (1) and (2) independently further comprise (e) at least one alkyl acrylate and methacrylate ester containing less than 4 carbon atoms in the alkyl group, (f) at least one co-polymerizable monomer, or mixtures of two or more thereof.

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41. The adhesive of claim 40 wherein (e) comprises methyl acrylate, ethyl acrylate, methyl methacrylate, ethyl methacrylate, and mixtures of two or more thereof.

5 42. The adhesive of claim 41 wherein (f) comprises polystyryl ethyl methacrylate, acetoacetoxyl ethyl methacrylate, alpha olefin, and vinyl esters of alkanoic acids containing more than three carbon atoms.

43. The adhesive of claim 25 further comprising a tackifier, plasticizer, or mixtures thereof.

10 44. The adhesive of claim 43 wherein the plasticizer is selected from an adipate, a phosphate, a benzoate, a phthalate esters, a polyalkylene oxide, a sulfonamide, and mixtures of two or more thereof.

45. The adhesive of claim 25 further comprising a cross linking agent.

15 46. The adhesive of claim 45 wherein the crosslinking agent is aluminum acetylacetone or a polyamine.

47. A laminate comprising a facestock, a release liner and the adhesive of claim 1 adhered to the facestock and releasably adhered to the liner.

16 48. The laminate of claim 47, wherein the laminate is a sign.

49. A laminate comprising a facestock, a release liner and the adhesive of claim 22 adhered to the facestock and releasably adhered to the liner.

20 50. The laminate of claim 49, wherein the laminate is a sign.

51. A laminate comprising a facestock, a release liner and the adhesive of claim 22 adhered to the facestock and releasably adhered to the liner.

52. The laminate of claim 49, wherein the laminate is a sign.

53. A laminate comprising a facestock, a release liner and the adhesive of claim 25 adhered to the facestock and releasably adhered to the liner.

54. The laminate of claim 53, wherein the laminate is a sign.

55. An article comprising a substrate adhered the laminate of claim 1 wherein the liner is removed from the laminate.

56. An article comprising a substrate adhered the laminate of claim 22 wherein the liner is removed from the laminate.

57. An article comprising a substrate adhered the laminate of claim 25 wherein the liner is removed from the laminate.

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